Small Business Innovation Research

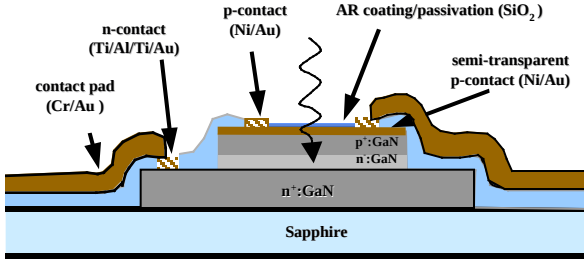
GaN Based High Temperature Ultraviolet Photodetectors

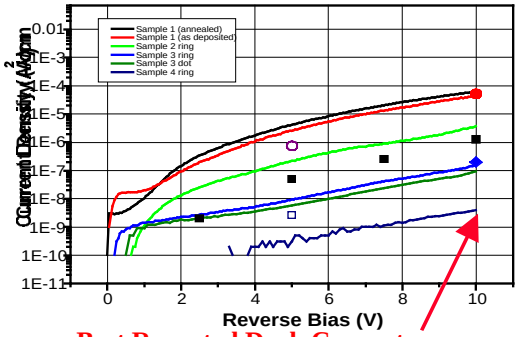
Emcore Corporation

Somerset, NJ

INNOVATION

EMCORE Corporation and the University of Texas have developed robust UV detectors based on GaN to replace existing photomultiplier or silicon technology





Best Reported Dark Currents: <2nA/cm² at -10V

ACCOMPLISHMENTS

- Produced homo-junction detectors with the lowest dark current (<2nA/cm^2), highest quantum efficiency (>40%), fastest time response (26 ps) and largest bandwidth (3 GHz) reported to date.
- Produced one of the first APDs in GaN with gains >20, a breakdown field of 4x10^{6}Vcm^{-1} and a positive temperature coefficient for breakdown.

COMMERCIALIZATION

- Over $2.2M in Phase III funding has been obtained to further enable the technology:
- NASA-CETDP: $375K to develop GaN CCDs arrays.
- NASA-ROSS: $271K to develop GaN photodiode arrays.
- DARPA: $894K as a subcontract to LMIR to develop solar blind arrays.
- BMDO: $678K to develop APD structures.
- Commercial applications include; environmental monitoring, automobile engine combustion sensing, solar UV monitoring, burner monitoring in gas turbines, and flame detection

GOVERNMENT SCIENCE/APPLICATIONS

- NASA: Remote sensing of earth resources Atmospheric ozone-level monitoring, and UV astronomy
- Military: Ground Vehicle Self Protection, Airborne Missile Threat Warning, Biological agent detection, and Engine monitoring and combustion control
- EMCORE is working with LMIR on a DARPA funded program to develop GaN UV detectors for the next generation of AN/AAR-47 Ultraviolet Helos Transports and AN/AAR-57 Ultraviolet Helos Transports Tactical systems.

Goddard Space Flight Center

1995 Phase II, SS5-038, 5/16/00

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